Center Independent Research & Development: GSFC IRAD

Rapidly Extending And Contracting Tubular (REACT) Boom System Development

Completed Technology Project (2017 - 2018)

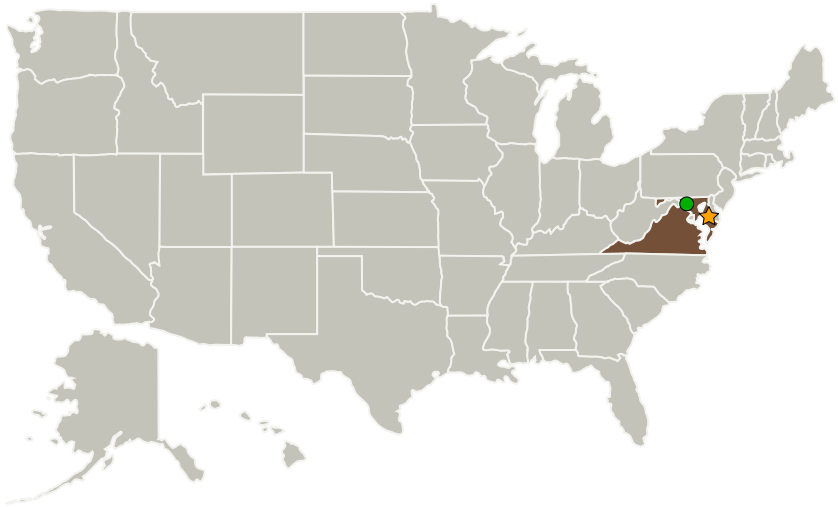
Project Introduction

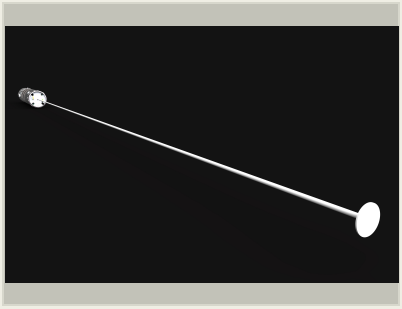
This project aims to create a prototype retractable, reel stored, tubular boom system with the capability to hold a magnetically sensitive science instrument or technology demonstration away from the bulk of a Sounding Rocket payload. This development was outlined as a key technology focus area for both the Suborbital Platforms and Range Services (SPARS) and Heliophysics Science Division (HSD) lines of business. The main objective of this development will be to design, fabricate, assemble, and ground test a prototype boom system with the capabilities required for both a sampling experiment and an occulting disk experiment.

Anticipated Benefits

A gap in the current capabilities available to sounding rockets exists, in part, due to a both a lack in the ability to retract a rigid payload boom back into the payload and a lack in the ability to utilize boom system power to deploy the boom element. The former is required for an environmental sampling type experiment while the latter is required for a solar occulting disk experiment. An occulting disk experiment would consist of a rigid payload boom extending collinearly with the rocket axis while the rocket axis was aligned with the sun. This deployment characteristic requires that the boom system deploy under generated power, from a motor or stored energy device. This is unlike the typical sounding rocket boom systems, which deploy under gravity or payload rotation for simplicity.

Primary U.S. Work Locations and Key Partners





Occulting Disk Experiment Concept

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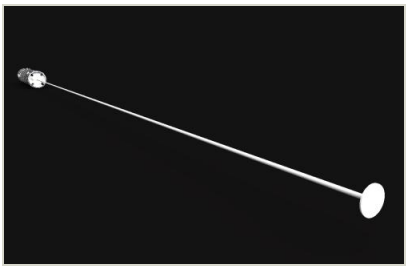
Organizations Performing Work	Role	Type	Location
★Wallops Flight Facility(WFF)	Lead Organization	NASA Facility	Wallops Island, Virginia
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Virginia

Images



REACT Boom System Concept Image
Occulting Disk Experiment Concept
(https://techport.nasa.gov/image/28274)

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Wallops Flight Facility (WFF)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

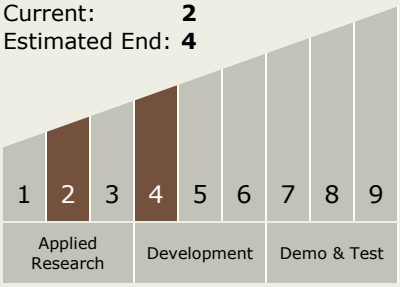
Program Manager:
Peter M Hughes

Project Managers:
Daniel A Mullinix
Michael G Hitch

Principal Investigator:
Joshua T Yacobucci

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **4**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.3 Mechanical Systems
    - TX12.3.1 Deployables, Docking, and Interfaces

Target Destinations

Earth, Foundational Knowledge

Supported Mission Type

Projected Mission (Pull)